



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/576,755

08/09/2006

Yoshiaki Sonobe

M4782

6031

35219

7590

08/17/2011

WESTERN DIGITAL CORPORATION
ATTN: LESLEY NING / IP LAW DEPARTMENT
3355 MICHELSON DRIVE, SUITE 100
IRVINE, CA 92612

EXAMINER

HARRIS, GARY D

ART UNIT

PAPER NUMBER

1727

MAIL DATE

DELIVERY MODE

08/17/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/576,755	Applicant(s) SONOBE ET AL.	
	Examiner GARY HARRIS	Art Unit 1727	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,6,11 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,6,11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Remarks

The following is a complete response to the remarks filed on 06/29/2011.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 5, 6, 11 & 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The term “no granular structure” is not enabled. A structure that has no granular structure would be an amorphous structure. A CoCrPt alloy would have crystal grains and be defined as a granular structure but would not have a granular structure where the nonmagnetic oxide would separate the grains.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 1727

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 5, 6, 11 & 12 are rejected under 35 U.S.C. 102(a) as being anticipated by Sakawaki et al. 7,470,474 B2.

As to Claim 1, Sakawaki discloses a perpendicular magnetic recording disk for use in perpendicular magnetic recording (see abstract and Col. 1, Line 29-35). The perpendicular magnetic recording disk has a substrate (Col. 1, Line 23) and a soft magnetic layer of a material selected from a group consisting of a Fe-based material and a Co-based material (Col. 6, Line 32-58) on the substrate (See figure 1, Col. 5, Line 44-54). A magnetic recording layer is on the soft magnetic layer and the magnetic recording layer includes a ferromagnetic layer (4) on the soft magnetic layer, having a granular structure and has crystal grains mainly made of cobalt (Co) and grain boundary portions mainly made of SiO₂ (See figure 2, Col. 9, Line 13-42 & Col. 10, Lines 55-62). A layer on the ferromagnetic layer (granular layer), has no granular structure (see figure 2, Col. 11, Line 3-10) and contains a material selected from CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Col. 12, Line 1-22). The content of the SiO₂ in the ferromagnetic layer is 6at% or more (8 at% or less, Col. 10, Line 47-48 & Col. 10, Line 55-67). The perpendicular magnetic recording disk has on the substrate a soft magnetic layer (2), a ferromagnetic layer with a granular structure (4a) and a layer having no granular structure (4b) in this order (See figure 1 & 2).

As to Claim 5, Sakawaki discloses a perpendicular magnetic recording disk, characterized in that a spacer layer (9) is selected from a group consisting of a Pd layer and a Pt layer (Col. 14, Line 1-67) and is between the ferromagnetic layer (granular layer) and the layer having no granular structure (no oxide) and is selected from CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Col. 12, Line 1-22).

As to Claim 6, Sakawaki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording (See abstract and Col. 1, Line 29-35, Col. 4, Line 62-67). A soft magnetic layer is made from a material selected from a Fe-based material and a Co-based material (Col. 6, Line 32-58) on a substrate (See figure 1, Col. 5, Line 44-54). The method is characterized by a step of forming the magnetic recording layer on a soft magnetic layer (See figure 1). The ferromagnetic layer has a granular structure using SiO₂ between crystal grains comprising cobalt (Co) (See figure 2, Col. 9, Line 13-42 & Col. 10, Lines 55-62). The content of the SiO₂ in the ferromagnetic layer is 6at% or more (8 at% or less, Col. 10, Line 47-48 & Col. 10, Line 55-67). A layer on the ferromagnetic (granular) layer has no granular structure (non-oxide in the layer) and is selected from CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Col. 12, Line 1-22).

Sakawaki discloses forming the ferromagnetic layer (granular) on the soft magnetic layer by sputtering in an argon gas atmosphere (Col. 18, Line 38-42) and then forming the layer with no granular structure from the materials consisting of CoCrPt,

Art Unit: 1727

CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Col. 12, Line 1-22) by sputtering in an argon gas atmosphere (Col. 12, Line 52-55). The method of manufacturing the perpendicular magnetic recording disk has on the substrate a soft magnetic layer (2), a ferromagnetic layer with a granular structure (4a) and a layer having no granular structure (4b) in this order (See figure 1 & 2). Sakawaki discloses using pressure in a range of 6 to 8 Pa in the formation of the granular layer (Col. 18, Line 61) while the pressure in forming the CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ is 2 to 5 Pa (Col. 20, Line 21) and is lower than the gas pressure required in forming the granular layer. Additionally, the product by process limitation is considered but is not limited to the recited steps only the structure. See MPEP 2113 [R-1].

As to Claim 11, Sakawaki discloses a perpendicular magnetic recording disk with an underlayer including Ru (intermediate layer 8) provided between the soft magnetic layer and the ferromagnetic layer (See figure 11, Col. 15, Line 6-17).

As to Claim 12, Sakawaki discloses a method of manufacturing a perpendicular magnetic recording disk for use in perpendicular magnetic recording (See abstract and Col. 1, Line 29-35, Col. 4, Line 62-67). A soft magnetic layer is made from a material selected from a Fe-based material and a Co-based material (Col. 6, Line 32-58) on a substrate (See figure 1, Col. 5, Line 44-54). An underlayer including Ru (intermediate layer 8) is provided between the soft magnetic layer and the ferromagnetic layer (See figure 11, Col. 15, Line 6-17).

Art Unit: 1727

The method is characterized by a step of forming the magnetic recording layer (4) on the underlayer(3), a ferromagnetic layer of a granular structure comprising SiO₂ between crystal grains comprising cobalt (Co) (layer 4a, see figure 2). The content of the SiO₂ in the ferromagnetic layer (granular layer) is 6at% or more (8 at% or less, Col. 10, Line 47-48 & Col. 10, Line 55-67). Above the ferromagnetic layer (granular layer) a layer having no granular structure and comprising a material selected from CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ (Col. 12, Line 1-22). Forming the ferromagnetic layer on the underlayer is done by sputtering in an argon gas atmosphere (Col. 18, Line 38-42 & (Col. 18, Line 61 discloses the Ar gas at a pressure of 6 to 8 Pa)) and then forming a layer having no granular structure from CoCrPt, CoPt, CoPd, FePt, CoPt₃, and CoPd₃ by sputtering in an argon gas atmosphere at a gas pressure lower than a gas pressure used when forming said ferromagnetic layer (2 to 5 Pa, Col. 20, Line 21). Additionally, the product by process limitation is considered but is not limited to the recited steps only the structure. See MPEP 2113 [R-1]. The method of manufacturing the perpendicular magnetic recording disk has on the substrate a soft magnetic layer (2), a ferromagnetic layer having the granular structure (4a) and a layer having no granular structure (4b) in this order (See figure 1 & 2).

Response to Arguments

Applicant's arguments filed 06/29/2011 (in italics) are addressed as follows:

ARGUMENT: Claims 1, 5, 6, 11 and 12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sakawaki et al (U.S. Patent No. 7,470,474, hereinafter "Sakawaki"). This rejection is traversed for at least the following reasons.

Art Unit: 1727

Claims 1, 6, and 12 require, inter alia, a layer, on the ferromagnetic layer, having no granular structure and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3.

Sakawaki discloses a magnetic recording medium having a soft magnetic primary coat, an orientation-controlling layer, a perpendicularly magnetic layer, a protective layer and a lubricating coat formed sequentially in this order on a nonmagnetic substrate. See column 5, lines 44-54, of Sakawaki.

The perpendicularly magnetic layer of Sakawaki is composed of a magnetic layer (4a) having Co as a main component thereof, containing at least Pt as well and containing an oxide and a magnetic layer (4b) having Co as a main component thereof containing at least Cr as well and containing no oxide. See column 9, lines 13-21, of Sakawaki.

On pages 3-4 of the Office Action, the Examiner asserts that the magnetic layer (4b) of Sakawaki is the presently claimed layer, on the ferromagnetic layer, having no granular structure and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3.

Applicants respectfully traverse the rejection and submit that Sakawaki does not disclose, teach or suggest a layer, on the ferromagnetic layer, having no granular structure and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3.

Sakawaki discloses that the magnetic layer (4b) has magnetic grains, and that the magnetic grains of the magnetic layer (4b) has epitaxial growth. See column 11, lines 11-15, of Sakawaki. Like the magnetic layer (4a), the magnetic layer (4b) also has a granular structure. Further, Sakawaki does not mention anything about a layer, on the magnetic layer (4a), having no granular structure and comprising a material selected from a group consisting of CoCrPt, CoPt, CoPd, FePt, CoPt3, and CoPd3.

Claims 5 and 11 depend from claim 1, and claim 1 is patentable for the reasons discussed above. Thus, claims 5 and 11 are patentable at least by virtue of their dependency on claim 1.

Applicant argues that Sakawaki does not disclose the ferromagnetic layer having no granular structure. However, as disclosed in the abstract and throughout the specification layer 4b is a magnetic layer and contains no oxide (see abstract). Magnetic layer 4b is preferred to contain Pt, Co and Cr (Col. 11, Line 33-35). The ferromagnetic layer of Sakawaki containing no oxides would be a ferromagnetic layer having no granular structure as claimed.

Applicant's arguments have been considered but they are not persuasive as Sakawaki anticipates applicant's claims.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Art Unit: 1727

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. H./Gary Harris
Examiner, Art Unit 1727

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1785